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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,854	08/17/2006	Alain Aubourg	0563-1081	3665
466	7590	10/31/2007		
YOUNG & THOMPSON 745 SOUTH 23RD STREET 2ND FLOOR ARLINGTON, VA 22202			EXAMINER COLEMAN, KEITH A	
			ART UNIT 4175	PAPER NUMBER
			MAIL DATE 10/31/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/589,854

Applicant(s)

AUBOURG ET AL.

Examiner

Keith A. Coleman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 8/17/2006.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-2, 4-9, 11-12, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morikawa (US Patent 6,138,638).

Morikawa discloses the same invention as claimed, such as the use of empirical data and tables (See Figures 24 and 25), fuel pressure comparisons (P_f , P_{fB}), multiple fuel calculations that use engine speed (NE), air/fuel ratio (via sensor 36), and previous data as parameters (See Figures 24, 25, and 14-16). The following action on the merits provides a detailed comparison between the claim limitations and the invention of Morikawa.

With regards to claims 1 and 8, the patent to Morikawa discloses a device (i.e. ECU 50, Col. 31, Lines 40-48) for monitoring (Col. 31, Line 64) the fuel pressure (35, Col. 32, Line 22) in the fuel feed circuit (21 and 26, Col. 29, Lines 51-52 and Lines 58-60, See Figure 19) of a fuel injection internal combustion engine (1, Col. 29, Lines 49-50), which comprises at least one cylinder (2, 12, Col. 29, Lines 35-37) and one exhaust line (18, Col. 29, Lines 42-45) for the combustion gases, characterized in that said device comprises - means (36, Col. 30, Lines 52-59) for generating a value for measuring the fuel/air ratio of the exhaust gases in said exhaust line (upstream of catalytic converter 19, Col. 29, Lines 45-47 and Col. 30, Lines 52-59), - means (36, Col. 30, Lines 52-59) for generating a value for measuring the fresh air flow rate into said cylinder (2, 12, Col. 29, Lines 35-37), - means (Col. 3, Lines 66-67 through Col. 4, Lines 1-4)

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determining the mechanical opening time (T_p , Col. 51, Line 50) of the injector (13, Col. 51, Line 51) of said cylinder (2, Col. 29, Line 35), and - computation means (via CPU 51 and ROM 52, Col. 32, Lines 48-62) for determining a reconstituted fuel pressure value (P_{fB} , via pressure regulator 27 and uses GF as an parameter for the predetermined tables, Col. 40, Lines 36-42, See Figures 8 and 17) from said value for measuring the fuel/air ratio of the exhaust gases (via I/O port 56 to sensor 36, Col. 32, Lines 18-24 and Col. Col. 32, Lines 49-62), from said value for measuring the fresh air flow rate (via I/O port 56 to sensor 36, Col. 32, Lines 18-24 and Col. Col. 32, Lines 49-62) and from said mechanical opening time (T_p , Col. 51, Line 50) of the injector (13). As to generating a value for measuring the fresh airflow rate, since sensor 36 (Col. 30, Lines 52-55, i.e. O_2 sensor) measures the air to fuel ratio (Col. 32, Lines 62-68) and the system diagnosing routine executes every 10 milliseconds (Col. 39, Lines 1-5) for a known combustion cylinder volume (12) and predetermined quantity of fuel (Col. 27, Line 36), it would have been obvious to a person of ordinary skill in the art at the time the invention was made to extrapolate or provide the fresh air flow rate via ECU 50 and CPU 51 of Morikawa, in order to prevent abnormalities of the fuel injection system (Abstract, Col. 1, Lines 6-14).

With regards to claims 2 and 9, the patent to Morikawa discloses means (via I/O port 56 to sensor 36, Col. 32, Lines 18-24 and Col. Col. 32, Lines 49-62) for determining the value of the mass of fuel injected (GE , GF , Col. 51, Lines 50-60) from said value for measuring the fuel/air ratio of the exhaust gases (via I/O

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port 56 to sensor 36, Col. 32, Lines 18-24 and Col. Col. 32, Lines 49-62) and from said value for measuring the fresh air flow rate (via I/O port 56 to sensor 36, Col. 32, Lines 18-24 and Col. Col. 32, Lines 49-62), - means (via 35, Col. 32, Line 22) for determining the value of the static flow rate (i.e. normal flow rate, Col. 33, Lines 42-56) of the injector (13, Col. 33, Lines 50-55) as a function of said value of the mass of fuel injected (GE, GF, Col. 51, Lines 50-60) and of said mechanical opening time (Tp, Col. 51, Line 50) of the injector (13), - means (PfB) for determining said reconstituted pressure value (PfB, via pressure regulator 27 and uses GF and GE as an parameter for the predetermined tables, Col. 51, Lines 50-60, See Figures 8 and 17) from said static flow rate (i.e. normal flow rate, PfB, Col. 33, Lines 42-56) of the injector (13, Col. 33, Lines 50-55) and from the value of the pressure (Pf, via pressure sensor 35, Col. 52, Lines 51-57, See Figures 8 and 17) near the injector nozzle (13).

With regards to claims 4, 17 and 18, the patent to Morikawa discloses a sensor (35, Col. 32, Line 22) for measuring the fuel pressure (Pf, via pressure sensor 35, Col. 52, Lines 51-57, See Figures 8 and 17) in said fuel feed circuit (21 and 26, Col. 29, Lines 51-52 and Col. 30, Lines 47-51, See Figure 19), - means (Pf) for making a comparison (Pf between PfB and CS1, Col 40, Lines 2-5 and 35-51) between the value for measuring the fuel pressure (Pf) taken by said sensor (35, Col. 32, Line 22) and said reconstituted fuel pressure value (PfB) and - means for making a diagnosis of the operating status of said pressure sensor (35, Col. 32, Line 22) from the result of said comparison (Pf between PfB and

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CS1, Col 40, Lines 2-5 and 35-51). Because the system uses a predetermined time (Cs1, Col. 40, Line 42) for Pf to reach PfB (Col. 39, Lines 21-33), it is inherent that the two values Pf and PfB are compared. In addition, since the definition of 'diagnosis' is defined as identifying the nature or cause of some phenomenon (i.e. the operating status), the last limitation is interpreted as meaning identifying the cause of the operating status of the pressure sensor, which is met when the ECU makes a comparison between PfB and Pf when the ECU diagnosing the system for abnormalities (Col. 39, Lines 22-35, Col. 40, Lines 1-5 and 35-50) such as low (PfL) and high pressures (PfH) of the fuel system (Col. 42, Lines 60-67).

With regards to claims 5, the patent to Morikawa discloses means (Col. 33, Lines 41-45) for initiating a fallback operating mode (i.e. fail safe control, Col. 33, Lines 41-45), when said reconstituted fuel pressure value (PfB) is higher, respectively lower, than a predefined maximum (PFH), respectively minimum (PFL), threshold value (Col. 33, Lines 30-41, Col. 42, Lines 61-67 through Col. 43, Lines 1-3), since Morikawa's device (ECU 50) waits until $P_f = P_{fB}$ (Col. 40, Lines 35-40) and compares Pf to PfL and PfH (Col. 42, Line 61).

With regards to claim 6, the patent to Morikawa discloses means (PfB, Col. 52, Lines 51-57) for adjusting the pressure from said reconstituted pressure value (PfB, via pressure regulator 27 and uses GF as an parameter for the predetermined tables, Col. 51, Lines 50-60, See Figures 8 and 17).

With regards to claims 7 and 12, the patent to Morikawa discloses means for detecting drifts (i.e. abnormalities) of the reconstituted fuel pressure value (PfB) and/or of the value for measuring the fuel pressure (Pf, Col. 52, Lines 51-57) and - means (15) for making a diagnosis (via CS1, Col. 39, Lines 29-32, Col. 40, Lines 1-5) of the status of said fuel feed circuit (21 and 26, Col. 29, Lines 51-52 and Col. 30, Lines 47-51, See Figure 19) from said drifts.

With regards to claims 11, 14 and 15, the patent to Morikawa discloses - generation of a value for measuring the fuel pressure (Pf) in said fuel feed circuit (21 and 26, Col. 29, Lines 51-52 and Col. 30, Lines 47-51, See Figure 19), - making of a diagnosis (via CS1, Col. 39, Lines 29-32, Col. 40, Lines 1-5) of the operating status of said pressure sensor (35, Col. 32, Line 22) from the result of the comparison between said value for measuring the fuel pressure (Pf) taken by said sensor (35, Col. 32, Line 22) and said reconstituted fuel pressure value (PfB). Since the definition of 'diagnosis' is defined as identifying the nature or cause of some phenomenon (i.e. the operating status), the last limitation is interpreted as meaning identifying the cause of the operating status of the pressure sensor, which is met when the ECU makes a comparison between PfB and Pf when the ECU diagnosing the system for abnormalities (Col. 39, Lines 22-35, Col. 40, Lines 1-5 and 35-50) such as low (PfL) and high pressures (PfH) of the fuel system (Col. 42, Lines 60-67).

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5. Claims 3, 10, 13, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morikawa (US Patent 6,138,638) in view of Edison (US Patent No. 3,896,773).

With regards to claims 3, 10, 13, and 16, the patent to Morikawa discloses all the limitations of the claimed subject matter including Morikawa's disclosure of means (Tp, Col. 51, Line 50) for determining said mechanical opening time (Tp) of the injector (13) from the electrical control time (Tp) of the injector, from the time interval necessary for the mechanical opening of the injector (Tp, 13), and from the time interval necessary for the mechanical closing of the injector (Tp, 13), except using the equation $d = d_1 - d_2 + d_3$, where d_1 is the electrical control time of the injector, d_2 is the mechanical opening of the injector, and d_3 is the mechanical closing of the injector. It is obvious that the mechanical control time and electrical control time are calculated with Morikawa's Tp. However, the patent to Edison discloses $d = d_1 - d_2 + d_3$, since on Col. 9, Lines 10-20 Edison discloses the two equations [1], [2] below:

$$[1] T_3 = T_c + T_d$$

$$[2] T_c = T_1 - T_2$$

By substituting T_c in equation [1], we obtain the following equation [3] below:

$$[3] T_3 = T_1 - T_2 + T_d$$

where T_3 , T_1 , T_2 , and T_d are control pulses. Since Edison explicitly states that T_1 and T_2 are used to manipulate injection times (Col. 7, Lines 10-16) and any desired function of the battery supply voltage (Col. 7, Lines 10-16, which includes

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supply voltages to mechanical devices) and Morikawa's ECU is programmable via CPU 51 and already capable of doing calculations (Col. 32, Lines 51-52), it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide the ECU's software via ROM 52 and CPU 51 of Morikawa (Col. 32, Lines 49-62) with equation [3] above for determining the mechanical opening time of the injector from the electrical control time of the injector from the time interval necessary for the mechanical opening of the injector and from the time interval necessary for the mechanical closing of the injector in view of the teaching to Edison, in order to promote synchronization of the engine (Col. 1, Lines 5-7 from Edison).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Elliot (US Patent No. 6,439,191) shows the current state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith A. Coleman whose telephone number is 571-270-3516. The examiner can normally be reached on Monday through Friday between 5:30-3 Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrence Till can be reached on (571) 272-1280. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*BRIAN NASH**B N**10/24/07*

Terrence R. Till
Supervisory Patent Examiner

KAC

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